4 BASELINE AND PLANNING

4.1 PURPOSE

The purpose of the DOE ERD baseline and planning guidelines is to identify roles and responsibilities, definitions, and the minimum requirements for preparation, review, and management of the project baseline. It is the qualitative and quantitative expression of the technical scope, schedule, and estimated cost needed to complete ER and decontamination and decommissioning work, integrating sound project management processes, controls, and reporting. The baseline is the principal PCS element and is used to plan project scope to a critical path schedule in the most cost-effective manner and then manage the project to the established baseline. This section defines the minimum processes, staff responsibilities, and guidelines used to develop, review, approve, and maintain the installation baseline.

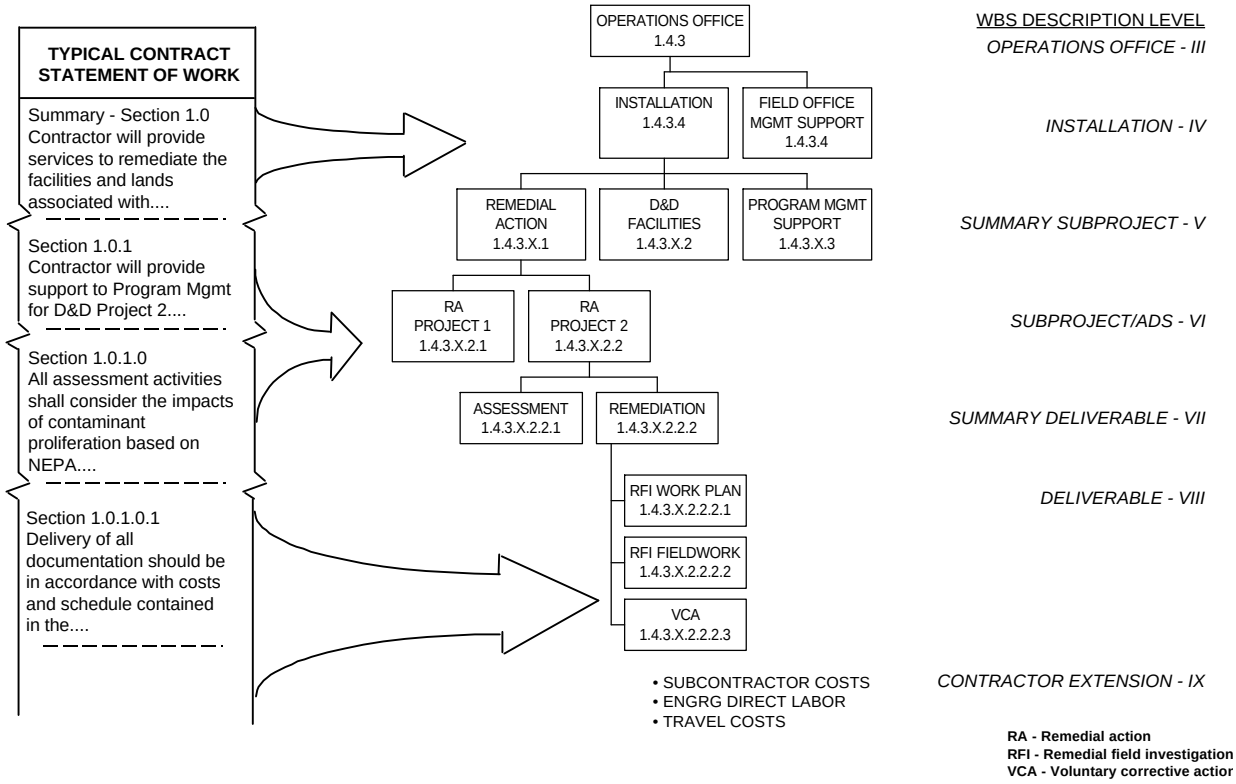
4.2 BASELINE PROCESS

The baseline embodies the project mission, objectives, design or characterization requirements, and specifications in order to define, execute, and control the project scope of work, schedule and cost. The technical requirements are the basis of the project WBS, cost estimate, schedule, and performance reports. Each installation must establish a technical baseline from which work can be accomplished and performance measured.

Baseline development begins with the scope of work in the contract. The installation maintains the WBS at least one level below the deliverable level (Figure 4.1); prepares detailed estimates of the technical scope, schedule, and cost for each WBS element (see Section 2); and submits the supporting documentation to the DOE for review and approval. DOE's approval of the technical scope, schedule, and cost estimates formally establishes the project baseline.

Control accounts usually are established at or just below the deliverable level within the ER projects or at the most logical intersection between the WBS and the installation's organization. The control account is the focus of cost and schedule control for each project. The responsibility for each control account is assigned to a Control Account Manager, who is responsible for controlling resources and tasks for the control account. Each installation maintains a list of Control Account Managers. In addition, each installation will establish, implement, and maintain a process for controlling the opening and closing of control accounts, which should be coordinated with the installation ER work authorization guidelines. For any opened control account, each installation will maintain a control account package to include, at a minimum, the following: work authorization record; definition of the technical scope,

Figure 4.1 Crosswalk of Sample Contract Statement of Work to ERD WBS



schedule, and cost estimate elements of the baseline; a budget for work reconcilable to the baseline; and a record of cost and schedule performance, baseline variance and corrective action, and baseline change control action.

4.3 ROLES AND RESPONSIBILITIES

The roles and responsibilities of the ERD, the staff at each AO involved in conducting ER and decontamination and decommissioning work, and the installation are listed below.

4.3.1 Environmental Restoration Division

With respect to baselines and planning, the ERD provides oversight and will:

- Prepare and distribute guidance specifying the minimum requirements for the preparation, review, approval, and maintenance of the installation baselines.
- Review and approve the installation baseline, after it is endorsed by the AO.
- Integrate the installation reports generated from the baselines into an ERD CPR.
- Evaluate and approve scope, schedule, and cost changes and the use of contingency as described in the applicable ERD change control guidelines.

- Coordinate/conduct periodic reviews of the installation's PCS and the installation baseline.

4.3.2 Area Office

With respect to the installation baseline, the AO will:

- Approve installation-specific procedures for the preparation, review, approval, and maintenance of the installation baseline.
- Review/verify the planned technical scope, schedule, and cost elements of the installation baseline for each WBS.
- Ensure that installations conform to the applicable standards established by installation-specific procedures and DOE guidance.
- Approve scope, schedule, and cost changes and the use of contingency funds as described in the ERD change control guidelines.
- Provide necessary support for external reviews.

4.3.3 Installations

With respect to the installation baseline and planning, the installation will:

- Develop, document, and implement a process for the preparation, review, approval, and maintenance of the installation baseline.
- Develop estimates of the technical scope, schedule, and cost for each WBS element and maintain the estimates and the supporting documentation through the life of the project.
- Ensure technical scope documentation, schedules, and cost estimates are prepared, maintained, and monitored by qualified personnel, according to accepted industry standards.
- Ensure the baseline reflects all regulatory agreements and commitments.
- Provide necessary support for external reviews.

4.4 ENVIRONMENTAL RESTORATION BASELINE AND PLANNING COMPONENTS

The installation is responsible for preparing, documenting, and maintaining procedures used in planning, reviewing, and maintaining the installation baseline. These procedures should describe how the three components of the baseline (technical scope, schedule, and cost) form the basis of the performance measurement baseline and how the EAC process is maintained. They also should provide all assumptions used in developing the baseline components.

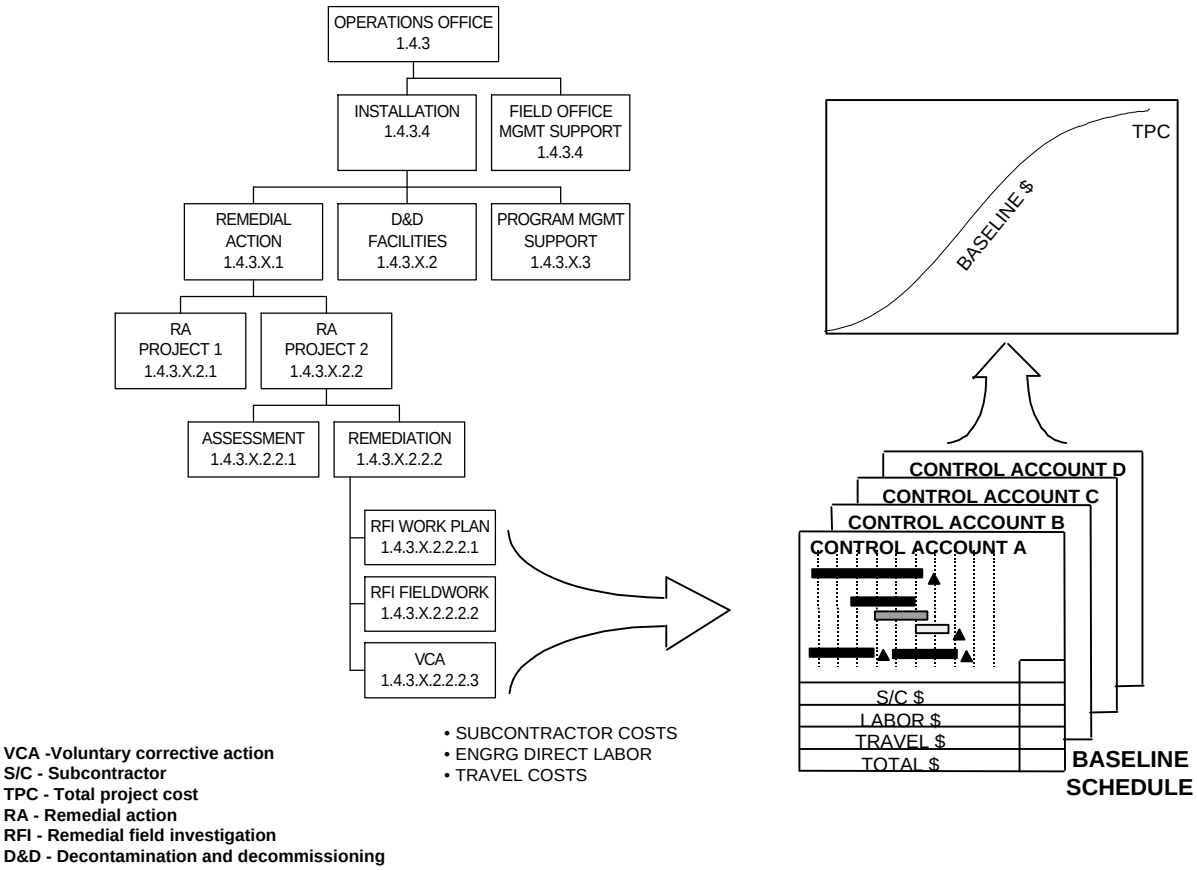
4.4.1 Technical Scope

Technical scope is the detailed description of requirements and activities that must be performed to satisfy project objectives. The scope describes what a project will achieve and the process of completing the assigned activities. ER and decontamination and decommissioning work requirements include applicable regulatory agreement specifications such as milestones, deliverables, sample or analytical quality and frequency, and cleanup standards. It also contains definitions of constraints and assumptions.

The installation defines the process, staff responsibilities, and documentation format for accomplishing the technical scope. The technical scope should:

- Provide the basis for the technical elements, which are traceable through all levels of the WBS (see Section 2 of this document).
- Clearly identify and relate to the schedule and costs used to measure performance with respect to satisfying technical requirements (Figure 4.2).
- Remain accurate and up-to-date.

Figure 4.2 Baseline Foundation



Technical scope evolves through the life of a project; many early assumptions are based largely on qualitative information regarding the nature and extent of contamination, contaminated media, and technology that will be used to characterize and remediate a site. As work proceeds, changes should be reflected in updates to the baseline scope documentation; these changes may result in the initiation of change documentation.

Installations should use standard project documents to meet scope documentation requirements. For example, prior to work plan approval by the regulator, a WBS dictionary may be the best format for defining technical scope. As the project progresses, the Resource Conservation and Recovery Act facility investigation work plan, the corrective measures study, and finally the corrective measures design documents become suitable as technical scope documentation. Equivalent Comprehensive Environmental, Response, and Compensation Liability Act documents may also be used to better define the work scope.

4.4.2 Schedule

Schedules provide the time-phased, logical relationships, and activity sequencing required to execute the technical scope of work. Schedules are hierarchical (integrated site schedule, intermediate schedules, and detailed schedules, as appropriate). The installation defines process, staff responsibilities, and documentation formats for the following:

- Documents used as the basis to specify the DOE schedule element of the baseline. The installation maintains these documents as the working schedule.
- Deliverables, DOE-controlled milestones, and milestones the installation needs to manage the Project.
- Identification of critical path activities.
- Documentation for tasks, durations, and logical relationships.
- Detailed budget preparation support, budget "what-if" analysis, and performance analysis.

4.4.3 Cost Estimate

The cost component of the baseline is an assessment of the dollars needed to complete the technical scope within schedule constraints. The installation defines the process, staff responsibilities, and documentation format for the cost component that:

- Uses estimating techniques that provide the most accurate forecast of all expected costs.
- Relies wherever possible on historic cost data.
- Documents labor, material, equipment, and subcontract cost element assumptions, etc.
- Provides all assumptions used in developing technical, schedule, and cost components.

- Provides discrete estimates of direct and indirect costs.
- Estimates escalation based on rates provided by the DOE.
- Estimates contingency and program risks.
- Is the basis for analyzing EAC projections.
- When summed up through all WBS levels, these estimates will equal the total project costs (TPC). This estimate is used as the basis to specify the DOE cost element of the baseline; after baseline development, the installation maintains the TPC as the working EAC.

4.4.4 Estimate at Completion Analysis

The installation's PCS procedure should include both processes and criteria for preparing periodic, detailed EACs. The PCS procedure should include, as a minimum, an annual review of the EAC. Each installation develops an estimate to complete (ETC) at the lowest WBS elements to determine the resources required to complete the tasks remaining in the current working schedule. In determining the EAC, the installation uses the latest rates experienced, both direct and indirect, and may reverify commitments with suppliers and subcontractors to accurately forecast completion costs for remaining work. These revised costs and assumptions should be reverified with all appropriate stakeholders and/or regulators.

AO and ERD review the revised EAC, ETCs, and assumptions, cross walks, etc. When scope changes, the installation generates BCPs for consideration (see Section 6 of this document).

EACs can be computed automatically by most project management software based on the monthly input of actual and/or accrued cost. Mathematical EACs can be reliably compared to the revised EAC if the original baseline estimates were valid and if only minimal changes to the original project assumptions occurred. However, because projects seldom proceed exactly as planned, the modified plan may not resemble the original plan. A detailed EAC is separate from the mathematical EAC and includes information not considered in the original baseline assumptions. A mathematical EAC merely verifies the accuracy of an EAC that was prepared manually.

4.5 RISK MANAGEMENT

Risk management is an important aspect of project management because every project contains uncertainties. These uncertainties include changes which impact funding, technical and regulatory requirements, and schedules. On large, complex, or long-duration projects, an integrated iterative risk management process provides a formal mechanism for assessing project risks and for developing mitigation strategies and plans.

A risk management process should consist of two major phases. The first phase, risk assessment, identifies, analyzes, and prioritizes project risks according to projected impact.

The second phase, risk mitigation, develops mitigation strategies for higher-priority risks; documents actions, time frames, and responsible parties in a risk mitigation plan; and implements the plan. The size and detail of the plan should be proportionate to the potential consequences of the project's risks and the resources available to implement mitigation strategies. Upon completion, this plan should be transmitted to the ERD and other key project stakeholders.

After a risk mitigation plan is prepared, the Project Manager is responsible for meeting with the management team to reassess the current risks and strategies, since these will change as the project matures. The frequency of reevaluation should correspond to the dynamics of change and uncertainty affecting the project. The risk mitigation plan should be revised to reflect new information and included in the baseline backup documentation.

4.6 CONTINGENCY ANALYSIS

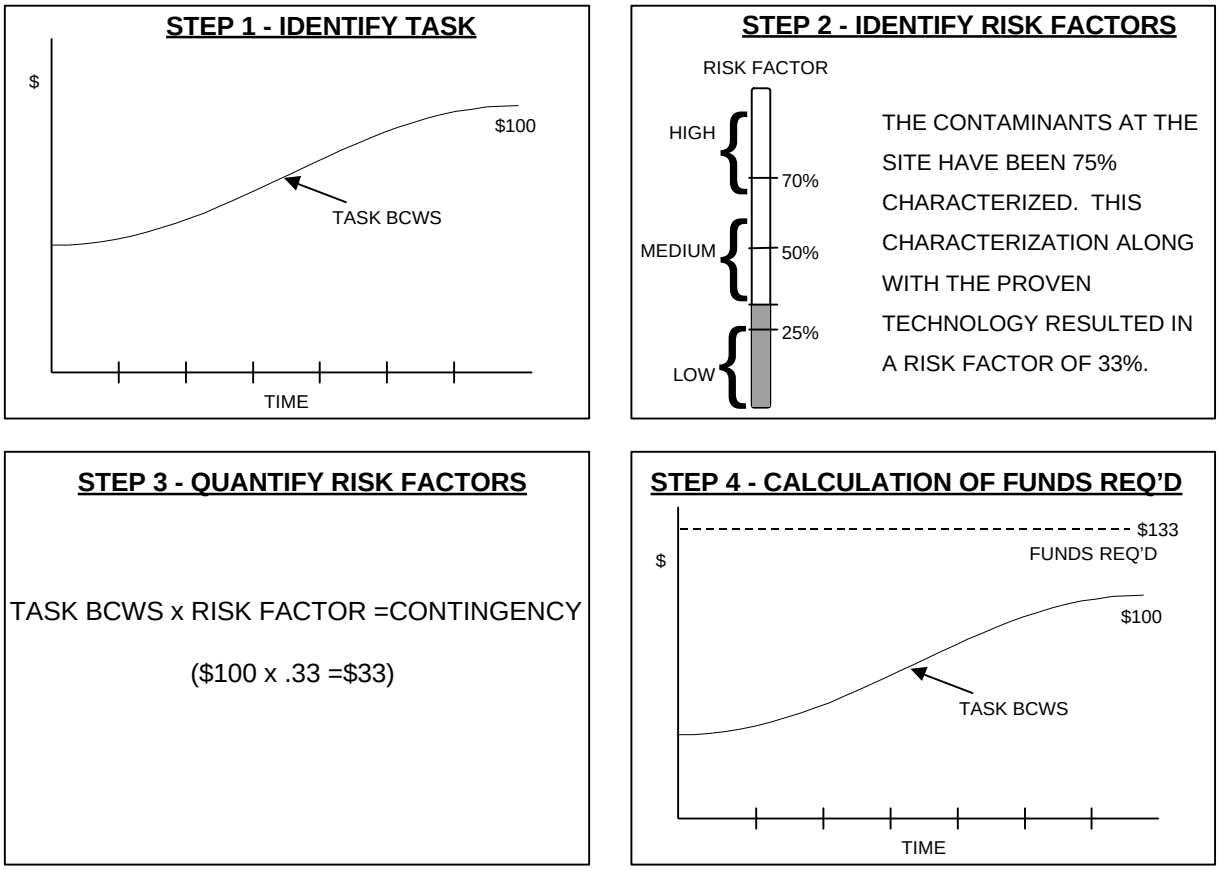
Contingency/risk analysis processes should be used throughout a project to identify risk factors and to develop an appropriate contingency budget. The contingency should budget for incomplete design, unforeseen and unpredictable conditions, or uncertainties within the project or subproject scope, etc. Because current fiscal year activities are better defined than those planned in the future, current fiscal year contingency budget will be substantially less than out year contingency.

Contingency is not part of the performance measurement baseline; however, it is included in the TPC. Contingency value is determined using designated risk factors. The DOE encourages the use of a graded approach in determining risk commensurate with dollar value, complexity, and project visibility. Project complexity and size are key elements in determining how the risk analysis should be performed. The contingency estimate must be documented and substantiated with reasonable assumptions. Contingency is calculated after base cost estimates are derived by determining risks associated with achieving the work scope. Figure 4.3 gives an example of a technique that can be used to develop contingency.

Each installation also must consider the time and money spent analyzing risks and developing risk mitigation strategies from a cost-versus-benefit basis. As identified in the LCAM GPG 07, "Managing or mitigating a risk should cost far less than realizing the risk itself would cost."

The ERD manages contingency in accordance with the ERD baseline change control processes (see Section 6 of this document). The DOE must approve any use of contingency in accordance with criteria established by the applicable ERD change control guidelines and

Figure 4.3 Development of Contingency – Example



established change control thresholds. When the use of contingency is approved, the contingency budget will be reduced and budgeted cost of work scheduled will increase. These changes will be documented in the contingency log.

4.7 MANAGEMENT RESERVE

The installation may establish a management reserve (MR) budget for flexibility in addressing unplanned but within-contract requirements. MR is not contingency; it is not estimated as part of the cost estimate but is established at the discretion of the installation during the annual budget allocation process. The annual MR value may not exceed 5 percent of the budget authority in years when the annual budget exceeds $10 million. MR can be up to 10 percent in years when the annual budget is less than or equal to $10 million. The installation (usually the installation's project manager) manages the MR (not the DOE). The establishment and management of MR should meet the reporting and change control guidance criteria established by ERD (see Sections 5 and 6 of this document).

REFERENCES

42 USC §6901 *et seq.*, *Resource Conservation and Recovery Act*, October 21, 1976.

42 USC §9601 *et seq., Comprehensive Environmental, Response, Compensation and Liability Act.*

DOE (U.S. Department of Energy Office of Field Management), 1996. *Life Cycle Asset Management Good Practices Guides*, March.